

main factor in controlling the temperature of the earth is the varying heat from the sun acting through changes of wind and atmospheric pressure has been mainly advanced by the work of Sir Norman and Dr. W. J. S. Lockyer and of Prof. Frank Bigelow; they are now strongly reinforced by Dr. B. Helland-Hansen, the director of the biological station at Bergen, and Dr. Nansen, who remark that these views have hitherto received but little support.

The important memoir by these Norwegian oceanographers is based on a detailed study of variations in the temperatures of the air and surface waters along the steamer route from the English Channel to New York. Their detailed discussion of the results and associated problems is accompanied by a valuable series of temperature charts of the North Atlantic for the months of February and March from 1898 to 1910. The data are often uncertain, and the inconvenience of the centigrade thermometer with its zero at freezing point is illustrated by records of water temperature of -3°C . and -4°C ., which have to be rejected. Drs. Helland-Hansen and Nansen, after discussion of the theory of oceanic control, reject it as quite inadequate. Thus the chilling effect of the drift of ice into the North Atlantic they estimate as "vanishingly small" in comparison with the heat transported by the air, or even by ocean currents. They consider that, though not yet fully established, the variations of the air temperature preceded, and were therefore not the result of, those of the water temperature. They hold that the variations of temperature require some much greater and more general cause than oceanic variations.

Faith in the meteorological influence of oceanic circulation was greatly favored by the exaggerated estimates attached to what the authors refer to as "the so-called Gulf Stream." Thus the warmth of the water off the Norwegian coast was attributed to that current even by Pettersson and Meinardus; this conclusion the authors describe as surprising because the evidence of salinity shows that the Norwegian waters are coastal and quite different from those of the mid-Atlantic. This sound criticism of the Swedish and Münster oceanographers renders it the more remarkable that there is no reference, either in the long historical discussion or in the bibliography, to the pioneer work on this subject in the earlier papers by Dr. H. N. Dickson, or to his observations as to the seasonal entrance of the Atlantic water into the North Sea. The authors agree with Schott in terminating the Gulf Stream west of Newfoundland, and calling the current off Western Europe the "Atlantic current," for which Dickson's name of "European current" is more descriptive and definite. The Atlantic is a large mass, and has a whole system of currents, of which the so-called Atlantic current is by no means the largest.

Drs. Helland-Hansen and Nansen, after rejecting the oceanic theory, accept as firmly established the dependence of variations in the earth's temperatures on the solar variations proved by sun spots, the numbers of solar prominences, and terrestrial magnetic disturbances. They point out that the influence of the sun on the weather of any area on the earth depends upon so complex a series of factors that the results at first sight appear inconsistent. The crude expectation that an increase of heat supply from the sun would raise the temperature of the whole earth was early dismissed, for the greater evaporation would lower the temperature on the coast lands by increased clouds, rain, and snow. Blanford pointed out, for example, the see-saw of oceanic and continental conditions; but, though his view has not been fully con-

firmed, his principle is supported by the proof that regions are oppositely affected by changes in the heat supply from the sun. Bigelow has divided the world into three groups of regions: In the "direct" group the temperature conditions vary directly with the sun; in the "indirect" group the variations agree in time, but are opposite in character; in the third, the "indifferent" group, there is no regular correspondence. Sir Norman and Dr. W. J. S. Lockyer have shown that a region may for years belong to the "direct" group, then suddenly become "indirect," and later return to the "direct" group. Drs. Helland-Hansen and Nansen accept this frequent inversion, and also their explanation of the phenomenon.

The author's instructive study of North Atlantic temperatures therefore strengthens the case for solar variations acting through the atmospheric circulation as the main cause of meteorological changes. To what extent the ocean helps by regulating the air temperature and circulation the authors do not discuss in the present memoir; that and other questions are to be dealt with after further investigations in a series of memoirs to which the present is introductory. The usefulness of the promised memoirs would be increased (should they have as many appendices and supplementary notes as the present) if each were provided with an index.

SERVICES OF A VESSEL-REPORTING STATION OF THE WEATHER BUREAU.

The following account of the grounding of the Dutch S. S. *Arakan* on August 29, 1920, near Point Reyes Light, Calif., has been furnished by Mr. J. C. Smith, in charge of the vessel-reporting station of the Weather Bureau at that place. It is published as an illustration of the services being rendered by the Bureau at vessel-reporting stations. The *Arakan* was subsequently refloated and arrived at San Francisco on September 1. The damage sustained, if any, is not known. The officers of the *Arakan* have for many years cooperated with the Bureau in marine work, and the news of her misfortune was received with regret.

On August 29, 1920, at 2 p. m. the Dutch S. S. *Arakan*, 5,000 gross tons, with cargo of sugar and rubber, bound from Batavia for San Francisco, went aground about 6 miles north of this station, during a dense fog. S. O. S. calls resulted in tugs being dispatched from San Francisco. However, they have not succeeded in pulling the vessel off. The vessel's wireless outfit failed on the 30th, and as a result this office was called upon for considerable information by maritime interests and newspapers of San Francisco. Weather and sea conditions were inquired about frequently; also, topographic conditions in the vicinity of the vessel. An aeroplane was dispatched from San Francisco to the scene of the wreck on the strength of information given by this office. Unless the vessel is pulled off the sand within a short time it may break amidship, resulting in the loss of the vessel as well as the valuable cargo.

This office remained open day and night during the critical stage answering inquiries by long-distance telephone.—F. G. T.

FIRST SCIENTIFIC CONFERENCE, PAN-PACIFIC UNION.

Under the auspices of the Pan-Pacific Union a scientific conference for the purpose of outlining a plan of exploring the Pacific Ocean was held at Honolulu, Hawaii, beginning August 2, and ending August 20, 1920. This conference brought together a few more than 100 scientists from the countries bordering on the Pacific Ocean. The United States, Australia, New Zealand, Japan, and the Philippine Islands were well represented.